

# PROPOSAL

Presented To:

**Derwick Associates**

for

**Conversion of Dual Machines**

*Prepared By*



Proposal No. 410-3443 Rev 1

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**This document is privileged and contains confidential information intended for use only by  
Derwick.**

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## **1.0 Introduction**

ProEnergy Services (“ProEnergy”) is pleased to provide this proposal to Derwick Associates (“Derwick”) for Conversion of Dual Machines for the 2 x 7EA power plant located in Margarita Island, Venezuela.

## **2.0 Scope of Work**

### **2.1 Performance of TIL 1346 – 7EA Stage 17 Rotating Compressor Blades**

Based on GE TIL 1346, the replacement of the 17<sup>th</sup> stage rotating blades is not required until the first major inspection and at each subsequent major inspection (if water injection is utilized). Therefore ProEnergy does not recommend replacement of the 17<sup>th</sup> stage rotating blades prior to putting the unit into service.

However, the cost to replace the 17<sup>th</sup> stage rotating blades is \$278,000.00 per unit. This price includes labor, supervision, technical direction, tools and equipment, and consumables to perform the work. This price is based on the assumption that the blades will be replaced without removing the rotor from the unit.

The price above does not include a set of 17<sup>th</sup> stage rotating blades. A new set of replacement 17<sup>th</sup> stage rotating blades (403CB alloy, uncoated) can be purchased from ProEnergy for \$50,000.00 plus shipping and import duties. This set of compressor blades is equivalent to GE Part Number 199E7421P001 and will fulfill the requirement of TIL 1346.

### **2.2 Commissioning of the 7EA gas turbine generator and auxiliaries**

Below are the rates for management and technical specialists to commission and start up the 2 x 7EA gas turbine power plant in Margarita Island, Venezuela. This scope includes all systems of the turbine generator and control systems. The scope of work includes filling and flushing systems; lubricating and testing pumps, fans, and motors; check out and testing of turbine generator electrical systems; calibration and verification of instrumentation; operational and functional checks; and turn over of each GE 7EA turbine generator. This budgetary estimate also includes two weeks of operator training and all the documentation and data for equipment commissioning and testing.

The number of personnel can be reduced or increased based on the scope of work to be performed and time allotted for start-up however the personnel below is representative of a standard commissioning and start-up team.

Position	Billing Rate/Hour
Project Start-Up Manager (1)	\$90.00
Lead Electrical Commissioning Engineer (1)	\$80.00
Turbine Electrical & Generator TA (1)	\$165.00
Lead Mechanical Commissioning Engineer (1)	\$75.00
Mechanical Commissioning Engineer (1)	\$70.00
Turbine Mechanical TA (1)	\$150.00
DCS Commissioning Engineer (1)	\$90.00
Turbine Controls TA (2)	\$165.00
Lead I&C Commissioning Engineer (1)	\$75.00
Turbine I&C TA (1)	\$150.00
I&C Technician (1)	\$73.00
Lock-out Tag-out Coordinator (1)	\$70.00
Turnover Coordinator (1)	\$70.00

#### 2.2.1 Commissioning Assumptions

- Operators and shift supervisors to be provided by plant owner or by ProEnergy at T&M rates.
- Gas Turbines are dual fuel (gas and #2 Diesel).
- Craftsmen supplied by installation contractor or by ProEnergy at T&M rates.

ITEM		MANHOURS	SUB-TOTALS	OVERHEAD	TOTALS
HOME OFFICE START-UP		980	\$98,300	\$0	\$98,300
HOME OFFICE EXPENSES			\$15,029		\$15,029
<b>SUBTOTALS ON HOME OFFICE STARTUP</b>		<b>980</b>	<b>113,329</b>	<b>0</b>	<b>113,329</b>
FIELD START-UP S/T	S/T	11,120	\$1,167,800	\$0	\$1,167,800
FIELD START-UP O/T	O/T	7,622	\$797,550	\$0	\$797,550
FIELD START-UP EXPENSES			\$437,488		\$437,488
<b>SUBTOTALS ON FIELD STARTUP</b>		<b>18,742</b>	<b>\$2,402,838</b>	<b>\$0</b>	<b>\$2,402,838</b>
CRAFT START-UP SUPPORT	S/T	20,080	\$0		\$0
	O/T	13,488	\$0		\$0
<b>SUBTOTALS ON CRAFT SUPPORT</b>		<b>33,568</b>	<b>\$0</b>		<b>\$0</b>
CHEMICAL CLEANING			\$0		\$0
OIL/HYD AND WATER FLUSHES			\$180,390		\$180,390
STEAM/AIR BLOWS			\$0		\$0

OFFICE EQUIPMENT	\$37,800	\$37,800
START-UP SPARES	\$30,200	\$30,200
ELECTRICAL RELAY TESTING	\$75,000	\$75,000
EMMISSION TESTING	\$0	\$0
START-UP TEST EQUIPMENT	\$60,000	\$60,000
FIRST FILLS	\$86,459	\$86,459
PERFORMANCE TESTING	\$80,000	\$80,000
MOBILIZATION/DEMObILIZATION	\$77,000	\$77,000
SOFT PRODUCT REPRODUCTION	\$0	\$0
SITE VISITATION	\$30,000	\$30,000
<b><i>SUBTOTALS ON STARTUP INDRECTS</i></b>	<b><i>\$656,849</i></b>	<b><i>\$656,849</i></b>
<b><i>TOTAL PROJECT START-UP COSTS</i></b>	<b><i>\$3,173,016</i></b>	

### 2.3 Mark V Replacement

ProEnergy has evaluated the Mark VI –E upgrade proposed for the Margarita units. ProEnergy believes that this PLC distributed type system requires increased maintenance than would a Mark VI or equivalent control system. ProEnergy base this on history of the system and the fact that they the PLC's utilized with the Mark VI-E are placed in environments (hot, dirty, and oily) that cause early failure. The PLC's in the system are redundant but fail more frequently than expected. Failure of these PLC's would temporarily cause the system to lose redundancy. Therefore ProEnergy recommend a traditional Mark VI or equivalent type system to control the gas turbine generator.

ProEnergy propose to build a Mark VI equivalent control system with a TSx RTP Controller. The budgetary price to supply this system is \$540,000 per unit. This price does not include shipping or customs fees.

The control system will be implemented at the site during the installation of the turbine generator. Additional costs for implementation will be minimal if ProEnergy perform the start-up and commissioning of the unit. Also, the dual fuel modification software and I/O will be included with the system. The new controller will interface with existing generator controls.

### 2.4 Spare Parts for the 7EA Dual Fuel Conversion

The spare parts quoted below include recommended spare parts for the systems added for the Dual Fuel Conversion. The type and quantity of spare parts was based on having assemblies to change out quickly while the defective components are being repaired. For example a spare fuel oil pump and minor repair kit is recommended to keep in stock.

The spare parts for the Turbine Control System cannot be determined until the control system is determined. However a budgetary estimate for these spares is \$100,000.00.

<u>Description</u>	<u>Qty</u>	<u>Price</u>	<u>Extended</u>
<b><u>Liquid Fuel system</u></b>			
Fuel Filters (accessory base)	24	\$112	\$2,679.60
Main Fuel Pump	1	\$95,219	\$95,218.60
Main Fuel Pump (minor repair kit)	1	\$8,036	\$8,035.90
Flow Divider	1	\$25,155	\$25,154.60
Isolation Valve	1	\$63,008	\$63,008.30
Liquid Fuel Check Valve	10	\$503	\$5,031.50
Gauge Panel - Pressure switch	2	\$1,015	\$2,030.00
Pressure Switch	1	\$964	\$964.25
Gauge Panel – Gauge	1	\$429	\$429.20
Parker Valve	1	\$1,399	\$1,399.05
Pump Clutch	1	\$14,645	\$14,645.00
<b><u>Water injection system</u></b>			
Water Injection Filters	12	\$154	\$1,844.40
Injection pump / motor assy	1	\$24,418	\$24,417.64
Water Injection Check Valve	10	\$641	\$6,409.00
Water Injection Stop Valve	1	\$3,058	\$3,057.76
Variable Frequency Drive	1	\$6,569	\$6,568.50
<b><u>Atomizing Air System</u></b>			
Air Filter	4	\$279	\$1,117.66
Booster Compressor	1	\$13,472	\$13,471.95
Booster Compressor – Motor	1	\$2,373	\$2,372.85
Booster Compressor – Belt	2	\$92	\$184.50
Main Atomizing Air Compressor	1	\$41,498	\$41,497.55
Main Atomizing Air Compressor - Quill Shaft	1	\$1,740	\$1,740.00
<b><u>Purge Air System</u></b>			
3-way purge valve assy	10	\$10,083	\$100,833.00
Red Hat Solenoid Valve	4	\$1,372	\$5,489.70
Pressure transducer - Purge protection panel	1	\$2,926	\$2,926.10
<b><u>Combustion System</u></b>			
Primary Fuel Nozzles	10	\$56,534	\$565,340.50
Secondary Fuel Nozzles	10	\$21,598	\$215,977.50

Note: These prices do not include shipping or customs fees.

### **3.0 Terms & Conditions**

This proposal shall be valid for thirty (30) days; provided, however, the obligation to treat this proposal as confidential, and that it cannot be shared with any third party without the prior written consent of ProEnergy shall survive.

This proposal, and any resulting contract or agreement, shall be subject to the terms and conditions mutually agreed upon between ProEnergy and Derwick.

### **4.0 Follow Up**

Please contact the following person at ProEnergy for information regarding this proposal:

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